SCHOOL BUS ACCIDENT RECONSTRUCTION, LLC

The School Bus Collision Investigation Online Newsletter

Volume 1, Issue 2

Critical PAR Contents:

Updated Seating Charts 2
Student Body Positions at Impact 3
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- Accurate school bus passenger seating charts are an essential part of a valid collision investigation but do not provide the same detailed information provided by onboard videorecordings.
- School buses without videotape recorders put the SBCIT at a significant disadvantage in litigation.

Why Police Accident Reports Alone are Not Enough for a Collision Investigation

The Police Accident Report (PAR) is not enough for an effective school district defense. Assuming that the PAR is sufficient for a strong defense in court may not be valid for a variety of reasons. The school district is left with a poor defense against unfavorable litigation, and the high costs and a significant impact to district taxpayers when self-insured districts must pay for out of court settlements. Other districts that are not self-insured face fleet insurance rates skyrocketing following a million dollar plus settlement. The Police Vehicle Accident Report is not enough for the SBCI Team to determine from the PAR:

Is the Bus Passenger Roster Complete? Police routinely interview each pedestrian on board the bus following a collision to obtain their name, their age or the grade in which they currently enrolled and attach a complete list of pedestrian bus occupants to the vehicle accident report. That list may not be complete or accurate.

Is the Police Accident Report representative of both the school bus driver and the other driver's perspectives? School Bus Collision Investigators must view the collision from the other driver's perspective and not automatically assume that it was the other driver's fault. Transportation Directors maintain a prejudice for or against the "other driver" that the SBCIT must not share in order to do an accurate and valid collision investigation.

Is the Police Accident Report accurate with respect to collision details? Unless there is a fatality involved police supervisors provide very little time for an onsite investigation of a school bus collision. Their policy may be to avoid completing the PAR and instead focus on quickly clearing onsite traffic backups.

The Videotaped Collision from Inside the Bus: 5 Seconds of Compelling Evidence

A 1000 words in a Police Accident Report describing who was seated where, who was nearest the point of impact or who was ejected out of their seats is typically not provided in the PAR. Any PAR is incomplete without a single 5 second videotape of the collision event from the student passenger and driver perspective. Some of today's school bus fleets are equipped with videotape monitoring of student misbehavior with a time and date stamp. One videosource from front to back is adequate but two or three camera views provide conclusive evidence for passenger ejection from their compartmentalization envelope, improper seated or standing positions at the moment of collision and other revealing facts.

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- Collision scene photogrammetry captures sufficient data to build a 3-D collision scene.
- Google Earth Pro Street Level provides valid roadway and intersection photography.
- No school bus videotape policy. FERPA misinterpretation, and FOIA
- Photodocumentation and the Haddon Matrix applied to school bus collisions

Effective School Bus Collision Exterior and Interior Photography

Effective school bus collision photography combines the collision scene overview, a detailed visual record of roadway, intersection or off-road environment, and an accurate analysis of exterior damage to all vehicles involved. The standard of excellence for successful exterior school bus collision photography is to represent the facts in such a way that few questions need to be asked and answered by anyone with an open mind viewing the photographic analysis of the collision.

No two school bus collisions are alike. All school bus collisions share the common laws of physics upon which the collision investigator can rely. Quality school bus accident reconstruction done by a representative of the plaintiff should contain the same conclusions as a separate reconstructionists conclusions done by a representative of the defense. All school bus collisions when properly investigated should produce the same conclusions done by both sides. All school bus collision accident reconstructions should be the same.

When collision scene photographic evidence is obtained 80% of the events prior to the collision should be clearly understood. Type I collisions between school buses and other vehicles, buses vs. off-road excursions, buses vs. roadway furniture, buses vs. pedestrians and other types of collisions have been effectively captured for all to view and to understand.

Type II collisions, or the occupant displacement of student passengers as the result of a Type I collisions are 90% captured by onboard videorecordings at least 10 second before the collision and for the duration of bus movement to the school bus point of rest.

Interior bus photography cannot be excelled by any means other than school buses equipped with videorecorders capturing visual and auditory data in a compelling fashion for any jury to understand—without words from either side. Why do so many attorneys for the plaintiff vigorously oppose the presentation of videorecorded evidence to the jury? Because 5 to 15 seconds of videotape evidence will make every juror understand the occupant displacements that occurred within the school bus.

Photogrammetry for the School Bus Collision Scene

Photogrammetry using 10 megabyte SLR digital cameras or image stabilized videocamera images can be analyzed using well-established technology to give a 3-D depiction of the collision scene. Still digital photographs from two different known perspectives are sufficient to be analyzed using photogrammetry. Video cellular phone sources, if of sufficient resolution can record the exterior collision scene using photogrammetry. Multiple datasources provide convergent documentation of the collision scene. GPS and laser distance handhelds, digital coefficient of friction instruments yield roadway or off-road surface skid mark accurate readings. Datasource analysis and 3-D animations are often ready in 60 minutes.

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- School bus collision preventability must be determined based on a careful school bus collision investigation.
- There are many clearly preventable collisions that can be identified and prevented by the school bus driver.
- There are far fewer non-preventable collisions that can be identified that prevent the school bus driver from preventing the collision.

School Bus Collisions—Preventable or Non-Preventable?

No two school bus and other vehicle collisions are exactly alike. Collisions appearing to be same have different drivers (Ds), different vehicles (Vs) and different environmental conditions (Es) present that may change one collision outcome to another.

The school bus driver decisions regarding collision preventability or non-preventability are often made by transportation supervisors, accident review committees and attorneys in litigation. Decisions made by each of these groups may be based on faulty assumptions and incomplete information.

Attorneys for both parties in litigation often assign percentages of fault for the school bus driver and another for the other driver. Accident review committees determine collision brought to them as school bus driver preventable or non-preventable ones. Transportation Supervisors have the option of determining preventability of a school bus collision on the basis of their own judgment or opinion and not necessarily on all of the relevant facts. School districts without a collision investigator or a school bus collision investigation Team (SBCIT)are obliged to make adetermination about school bus driver performance on the basis of an incomplete investigation. Collision investigations, when complete and done accurately, often identify driver errors on both sides of the collision event.

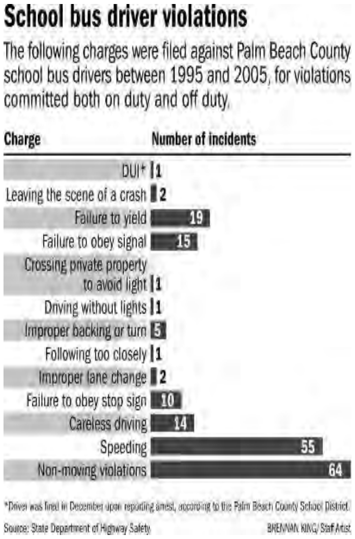
Some districts have a policy that all school bus collisions are brought to the accident review committee. Other districts provide for Supervisory discretion to bring only those most difficult to determine school bus collisions to the accident review committee. Neither of these decision-making strategies rely on the results of a valid collision investigation. Without a complete collision investigation any determination of preventability by the school bus driver may be a flawed decision.

Collision investigators, individually or as a team, do not have the luxury of selecting the school bus collisions they will investigate. SBCITs investigate near misses and close calls that did not lead to a collision as well as collisions.

Not all school bus collisions are preventable. Yet the majority of decisions made by transportation supervisors and accident review committees determine "preventability" and recommend school bus driver sanctions.

Some types of school bus collisions can be prevented by informed, alert and careful drivers. Those drivers are professionals who adhere to safety policies and procedures in their Department and know what countermeasures are available to them in a potential collision situation. Some countermeasures will require changes in school bus maintenance, equipment, routes, and other procedures and may require additional classroom and on-the-road retraining even for the most experienced and of school bus drivers who for many years have been collision free.

The following guidelines provided in this newsletter should be carefully considered and validated by a collision investigation before final determination is made with respect to the school bus driver's collision preventability.



School bus driver violations

The following charges were filed against Palm Beach County school bus drivers between 1995 and 2005, for violations committed both on duty and off duty.

*Driver was fired in December upon reporting arrest, according to the Palm Beach County School District.

Source: State Department of Highway Safety

BRENNAN KING/Staff Artist

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The School Bus Collision Investigation Online Newsletter

Volume 1, Issue 5
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Preventing school bus collisions, reducing lost driver time, passenger injuries and fatalities are the Transportation Directors responsibilities. The SBCIT must provide useful, timely, and need ed information. SBCITs help Directors eliminate underlying causes, prevent similar collisions when investigations are convened rapidly, staffed and supported adequately. Reports are focused on pertinent and essential facts and causation, conducted accurately and thoroughly, concluded quickly, and reported clearly and concisely. Analytical techniques used to draw conclusions and determine causes must be valid, appropriate and easy to use.

Investigating School Bus Rear-end and Underride Collisions

Following front-end collisions the second most frequently occurring school bus accident is the rear-end collision or the added feature of an underride. Underrides may also occur at an angle to either side of the bus. This newsletter will address the investigation process for such collisions.

The 2005 National School Bus Specifications Resolution No. 6 addressed the Underride collision. Their resolutions are summarized here:

1. WHEREAS, large numbers of vehicles collide with the rear end of school buses each year, and many of these vehicles underride the school bus, resulting in serious injuries and deaths to occupants of other vehicles; and 2. WHEREAS, most Types A, B, and rear engine Type D school buses have rear bumpers with a ground clearance of approximately 20 inches, and most Type C and front engine Type D school buses have ground clearance up to 30 inches; and 3. WHEREAS, a recent increase in the installation of fuel tanks behind the rear axle between the frame rails on large school buses may increase the potential for a fire resulting from an underride crash; and 4. WHEREAS, currently the Federal government has recognized and legislated rear underride protection height of 22.4 inches for the trailer and semi-trailer industry; and 5. WHEREAS, school buses frequently stop in high-speed areas of the roadway, at railroad crossings, intersections, residential areas and other areas of the road system; and 6. WHEREAS, while underride crashes are not caused by the school bus driver, an industry focused on safety has an obligation to consider the safety of motorists that share roads with school buses; now THEREFORE, BE IT RESOLVED that the 14th National Congress on School Transportation (NCST) request the National Highway Traffic Safety Administration (NHTSA) to study and recommend appropriate action to reduce injury and death associated with underride crashes involving collisions to the rear area of school buses.

For the school bus collision investigation team most of the problems and issues identified do not directly address the most severe of collisions in order of severity:

MOST SEVERE-Passenger car rear end underride with intrusion of the Type C or D school bus rear bumper well into the passenger compartment and often resulting in fatalities. Fortunately, these collisions rarely occur within a school district. Some districts have never had this event occur with their fleet.

MOST SEVERE-Passenger cars striking at an angle the side of the bus with a Type C or D school bus side rail intrusion into the passenger compartment resulting in fatalities. Side underrides with severe intrusion are also rare but happen somewhat more frequently than rear-end intrusions. fatalities

MOST FREQUENTLY OCCURRING-Passenger vehicle rear ending the Type C or D school bus with intrusion up to the windshield without intrusion into the passenger compartment.

NEXT MOST FREQUENTLY OCCURING-Passenger vehicles striking the side of the Type C or D school bus side rail and underride up to the windshield without passenger compartment intrusion. Four types or zone collisions are illustrated below.

There is a separate issue regarding Type B school buses with weights under 10,000 lbs. and their increased vulnerability to being overturned by a passenger vehicle collision. Four types or zones below.

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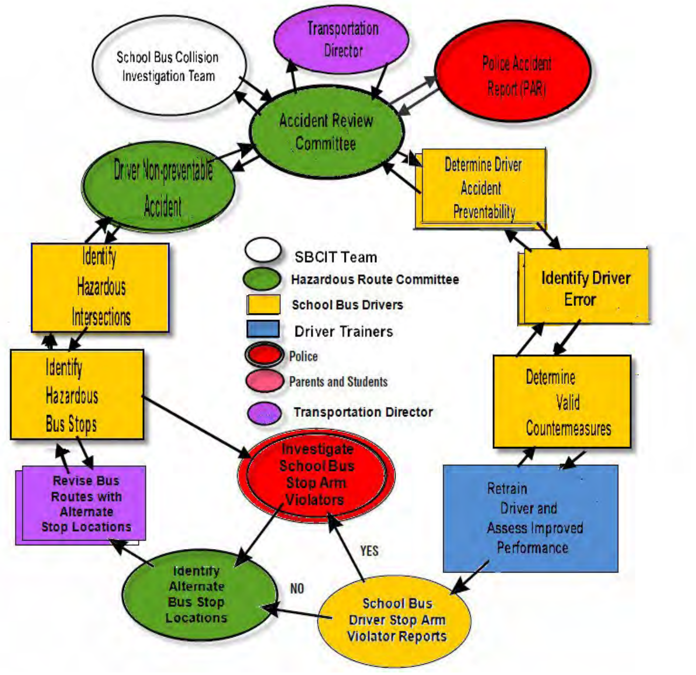
School Bus Collision Team and the Accident Review Committee

The SBCIT should remain neutral and independent and present their results in a Collision Investigation Report that is framed in an unbiased way. The Accident Review Committee receives the report and determines one three basic reasons for the collision to have occurred: 1. A driver or students are endangered in a collision that may be repeated unless properly dealt with. 2. In the wide array of possible school bus collisions, including those with student pedestrians, which are the collision types that are the most controllable or which can stop with appropriate countermeasures? 3. From the legal perspective, the ARC carefully selects the causes of a collision from the Report which may generate legal liability. In the Model below are depicted all of the elements that must be considered by the ARC based on SBCIT Report content.


School Bus Collision Investigation Team
Transportation Director
Police Accident Report (PAR)
Accident Review Committee
Driver Non-preventable Accident
Determine Driver Accident Preventability
Identify Hazardous Intersections
Identify Driver Error
Identify Hazardous Bus Stops
Determine Valid Countermeasures
SBCIT Team
Hazardous Route Committee
School Bus Drivers
Driver Trainers
Police
Parents and Students
Transportation Director
Revise Bus Routes with Alternate Stop Locations
Investigate School Bus Stop Arm Violators
Retrain Driver and Assess Improved Performance
YES
NO
Identify Alternate Bus Stop Locations
School Bus Driver Stop Arm Violator Reports

The Model depicts all of the major "actors" with inputs direct or indirect to the BCIT and the Accident Review Committee. The SBCIT Report should contain the following when applicable to a specific collision event: 1. Identify and describe the true course of events (what, where, when). 2. Identify the direct and root causes or contributing factors of the collision (why). [Root cause-the causal factors that, if corrected, would prevent the recurrence of an accident.] 3. Identify risk reducing measures to prevent future, comparable accidents (learning). 4. Investigate and evaluate the basis for potential civil or criminal prosecution (blame). 5. Evaluate the question of guilt in order to assess the liability for compensation (Penalties) which may result in litigation with the Court requiring submission of the Report and all of the ARC findings. SBCIT members and ARC members may be deposed by the plaintiff regarding the facts in the case.

The Report does not contain more data than what is directly related to the collision event. Reports should be written so that they are readily understandable. When technical terms are used a glossary or embedded definition is provided (see Root Cause definition above as an example to be used in a Report). The Report must meet the expectations of the ARC members who can clearly understand the chain of collision events from start to finish, the actors involved, and the root cause if there is one clearly identifiable.

The SBCIT Report should evidence a systematic framework such as the Model shown here that identify the procedures that are the most important and necessary tasks that were done at the onsite investigation. The Report must avoid duplicative or irrelevant tasks. It should help the ARC to quickly and efficiently the actual sequence of collision events as well as identifying distracting or irrelevant collision events. The Report should result in the ARC members having no confusion about what happened, no unsuspected gaps or holes in the explanation, and no conflict of understanding among all who read

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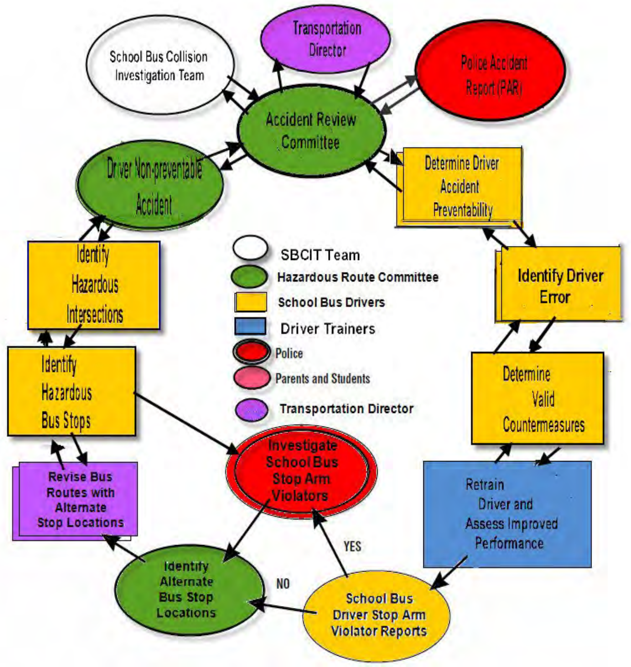
Student Pedestrians and Stop Arm Violators: Ignore or Prevent?

School bus collision investigation personnel's biggest concern and the most frequently occurring unresolved are "close calls" or more properly called "proximity events." Other than a transportation supervisor observing several hundred or thousand bus stop locations each day-morning and afternoon- the only hope of identifying school bus stop arm violators is to receive from the bus drivers a valid report with as much information as possible about each potential collision event related to stop arm violations. Note that in the model below the term "School Bus Driver Stop Arm Violator Reports" and how those reports are directly related to other model elements including: Investigate school bus stop arm violators; identify alternate bus stop locations; revise bus routes with alternate stop locations and identifying hazardous bus stops.


School Bus Collision Investigation Team
Transportation Director
Police Accident Report (PAR)
Accident Review Committee
Driver Non-preventable Accident
Determine Driver Accident Preventability
Identify Hazardous Intersections
Identify Driver Error
Identify Hazardous Bus Stops
Determine Valid Countermeasures
Revise Bus Routes with Alternate Stop Locations
Investigate School Bus Stop Arm Violators
Retrain Driver and Assess Improved Performance
Identify Alternate Bus Stop Locations
School Bus Driver Stop Arm Violator Reports
YES
NO
SBCIT Team
Hazardous Route Committee
School Bus Drivers
Driver Trainers
Police
Parents and Students
Transportation Director

SBCIT members interact with many other persons with different responsibilities and authority in the "chain of command." An organizational chart does not always reflect the actual flow of decision making and actions taken. This model is a proposed on based on the author's twelve years as a central transportation office administrator. The reader may identify some of the same relationships between personnel as indicated in the model or they may draw their own model to reflect local district conditions.

The central purpose of this newsletter and of the model proposed and other information to follow is to reduce stop arm violations and increase the safety of students as pedestrians.

Note next in the model that the transportation supervisor, in consultation with the School Bus Accident Review Committee (SBARC), will identify alternate bus stop locations and observe whether there is a decrease in bus stop arm violators and violations. Then the Router will revise the bus stop route to show the alternate bus stop location. Following that the school bus driver does a followup at the new to identify hazards at that new bus stop location, if any. The actual process in a transportation department may not be in this order and the personnel (elements) of the model may not interact as shown.

What is not shown in the model is the answer to a fundamental question: "Do We Ignore Stop Arm Violators or Do We Prevent Them?" This question should be thoroughly considered by each school district transportation director as well as the School Bus Collision Investigation Team that receives a report or does an onsite investigation at a bus stop where there are one or more stop arm violations occurring.

The model indicates that school bus drivers should report all stop arm violators by filling out a report form. The supervisor will receive the report and assign the SBCIT to do an onsite investigation/observation of the bus stop in question to document as best as possible the identity of one or more stop arm violators there.

The model shows that of the school bus driver does not report a stop arm violator and the transportation supervisor receives a complaint from another motorist, a parent of a bussed student or another credible source then the SBCIT will do an onsite observation.

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Special Needs School Bus Collision Investigation

Special needs bus accidents, though infrequent and usually not serious for students or for the Driver Team, require adults that are trained to respond appropriately to the accident and effectively manage their students. Policies for bus accident prevention and management are clearly defined by the School Board and by the Transportation Department that provide specific procedures for Driver Teams to observe. Since the School Bus Collision Investigation Team (SBCIT) will be present immediately after the collision event was reported or called in.

Post-Incident Procedures on the Special Needs Bus and the SBCIT

Special Needs School Bus Driver Team (Driver and Assistant) Post-Incident Procedures	School Bus Collision Investigation Team (SBCIT) Post-Incident Investigation	School Bus Collision Investigation Team (SBCIT) Post-Incident Collision Event Documentation	Transportation Supervisor's Post-Incident Collision Event Procedures	Parents of the Special Needs Child as a Passenger or Pedestrian Boarding or Egressing from a Special Needs Bus
Did the Driver Team protect all passengers from injuries and the bus from further damage? If the choice is protect students over preventing further bus damage, then did the Team protect the students above all else?	Did the SBCIT on post-incident scene care for students before anything else? Did the ASAP then obtain student school bus seating chart listing with names, ages and grades?	Was the School Bus Collision Investigation Report initiated at the scene used to record bus number, collision scene rough sketch, interview the bus driver and the other driver involved?	Did the Transportation Supervisor (SPV) arrive at the scene in a timely manner? Did the SPV coordinate with Building Administrator (BLD) and Police Accident Reporting while supporting the SBCIT in their onsite investigation?	Were Parents (PAR) of a special needs child (SPD) notified ASAP by the BLD as to where they can pick up their child? Which children, with parental permission. were transported in a replacement bus brought to the scene?
The National Safety Council (NSC) has indicated that passenger accidents on the special needs bus are preventable when caused by faulty operation of the bus by the professional driver. Did the driver operate the bus in any	Did the SBCIT on post-incident scene before completing of their onsite investigation determine that the special needs bus driver operated the bus in an unsafe or negligent way?	Did the SBCIT include in their report any specific details observed at the scene that would indicate that the special needs driver operated the bus in any unauthorized way?	Did the SPV facilitate the work of the SBCIT at the scene during and after the students have left the scene?	Did the parents request that their child ride a substitute bus to or from school to complete the route?
Drivers who stops, turns or accelerates abruptly are not preventing special needs passenger accidents. Did this Bus Driver stop, turn or accelerate abruptly during the collision event?	Did the SBCIT on post-incident scene before completing of their onsite investigation determine that the special needs bus Driver stopped, turned, braked or accelerated suddenly?	Were the bus skid marks length, beginning and ending point, all tires braking, fewer tires braking noted in the SBCIT Report?	Did the SPV assist the work of the SBCIT at the scene during and after the students have left the scene?	Did the Parents of children on the bus take custody of their child at the collision scene? Was there a written listing of those who children who left with their Parents?

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Volume 1, Issue 9

School Bus Driver Sight Lines and Field of View Investigation

The School Bus Collision Investigation Team (SBCIT) must carefully both the school bus driver sightlines and the driver field of vision (FOV). Driver sightline and field of vision of the student pedestrian is a critical factor in the collision investigation. This newsletter will address school bus driver sightlines and field of view with respect to a collision with a pedestrian who was in front of the school bus when struck down.

Determining School Bus Driver Sightline (DSL)

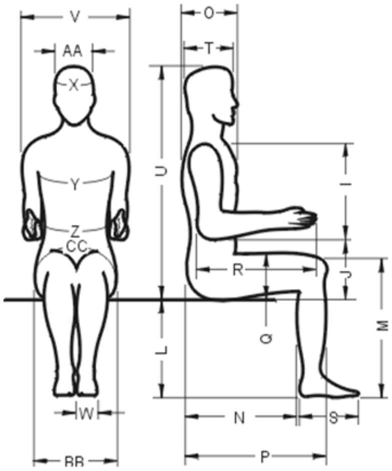
While the height of eye for the automobile driver is usually 3.5 ft. above the ground or street level the eye height school bus drivers is at least 7.6 ft. How to measure drive eye height should be done while the school bus driver is seated and sitting erect with the three-way lap belt installed the school bus driver who was involved in the collision event.

The following measurements should be taken:

DSL1. Height from ground (street level) to base of driver seat. NOTE: One SBCIT member may use a yardstick to hold in position while another SBCIT member photographs each of these measurements from two perspectives:

(a) Closeup photograph of yardstick measurement that is indicated in the investigation report.

(b) While backing off take a side view photograph of yardstick measurement that shows a full seated driver view as indicated in the investigation report. Photo will show ground level, stepwell area, bus floor and base of driver seat. (Be sure to use flash to obtain high contrast photographs. Take at least two for each viewpoint and number all pictures taken in a collision scene log book.)



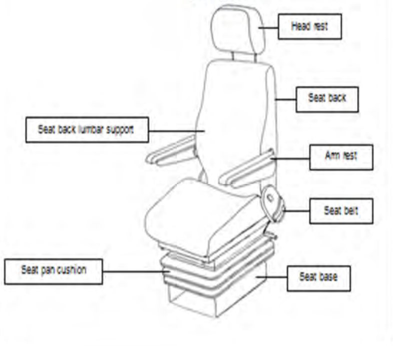
DSL2. Height of base of driver seat to level of seat contact height of the underside of the thighs. (Refer to diagram measurement “L” above.) NOTE: One SBCIT member may use a yardstick to hold in position while another SBCIT member photographs each of these measurements from two perspectives:

(a) Closeup photograph of yardstick measurement that is indicated in the investi gation report.

(b) While backing off take a side view photograph of yardstick measurement that shows a full seated driver view as indicated in the investigation report. Photo will show bus floor area and the driver seat base as well as a full view of the driver seated there. (Be sure to use flash to obtain high contrast photographs. Take at least two for each view point and number all pictures taken in a collision scene log book.)

(b) Average distance from bus floor to under thigh will be (15” minimum to 21” maximum with an average of 18”).

FIGURE 6
Driver's Seat



DSL3. Height from seat height to driver eye level. (Not shown in the diagram. Draw a line across the face in the middle of the ears as shown and that will be the approximate position of the eyes. When taking photographs this may vary with the individual school bus driver. NOTE: One SBCIT member may use a foot ruler to hold in position while another SBCIT member photographs each of these measurements from two perspectives:

(a) Closeup photograph of foot ruler measurement that is indicated in the investigation report.

(b) While backing off take a side view photograph of foot ruler measurement that shows a full seated driver view as indicated in the investigation report. Photo will show bus floor area and the driver seat base as well as a full view of the driver seated there. (Be sure to use flash to obtain high contrast photographs. Take at least two for each viewpoint and number all pictures taken in a pedestrian collision scene log book.)

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School Bus Driver Distractions Investigation

The School Bus Collision Investigation Team (SBCIT) must carefully consider school bus driver distraction from the forward roadway. Driver Distraction, Operational Definition—a driver who looks away from the road ahead or viewing the mirrors behind for 2 seconds or more is said to be a "distracted driver." Driver eye movements and face can be recorded in the bus by means of videotaping or digital camera recordings to determine exact lengths of distractibility which occur for each driver during every hour of school bus route service.

The School Bus Collision Investigation Team (SBCIT) must carefully consider school bus driver distraction from the forward roadway.

School Bus Driver Inattention--Driver inattention was defined for this report as one of the following: 1) Driver engagement in secondary tasks (those tasks not necessary to the primary task of driving); 2) Driver drowsiness; 3) Driving-related inattention to the forward roadway; and 4) Non-specific eye-glance away from the forward roadway. Accounts for 12.7% of all roadway departures.

School Bus driver Eyeglance Time--Any time a driver's eyes were averted from the forward roadway, regardless of the reason, the near-crash/crash risk increases when the eyeglance is over 2 seconds.

School Bus Driver Eyeglances Away from the Forward Roadway--specifically those to check rear-view mirrors, are important to safe driving.

School Bus Driver Eyes Off the Forward Roadway--except when the driver was looking at the center, right, or left rear-view mirrors or checking traffic out the right or left windows the driver's eyes are off the forward roadway.

School Bus Driver Length of Longest Glance Away from the Forward Roadway--The length of each glance away from the roadway.

Total time school bus driver eyes are off the forward roadway--The number of seconds that the driver's eyes were off the forward roadway during the 5 seconds prior and 1 second after the onset of the precipitating factor or critical pre-crash category or event.

On-board Monitoring System--Computerized tracking of driver and vehicle performance, including speed, fuel consumption, etc.

School Bus Video Surveillance Systems--School buses may be equipped with video cameras have the technology advantage of images recorded in digital format onto a computer hard drive. The primary reason for installing video cameras on school buses is to provide security for all bus occupants. Video camera effectiveness also includes reducing bus vandalism and other disturbances on school buses. Recorded video images are also very useful in resolving problems involving passenger safety and passenger complaints. Review of the recorded images can help to determine actual events when there are conflicting versions of a safety incident or a collision event.

School Bus Driver Inattention involves Eyes off the Road (EOR), Risky Manual Tasks while driving (RMT), Risky Cognitive Tasks (RCT), and Looking but Not Seeing (LNS).

100 Driver Distractions are briefly presented in this newsletter to afford the SBCIT the myriad of distractions to which school bus drivers are subjected or when drivers subject themselves to other distractions.

Please note that the distractions are more completely analyzed and additional information presented in a separate Excel spreadsheet file. As a subscriber you may request from the author this copyrighted file for a more exhaustive treatment of the school bus driver distraction problem.

The SBCIT study of school bus driver distraction videorecordings taken within the school bus at a minimum will:

1. Document the chain of events before, during and after the collision or safety threat.
2. Substantiate or refute claims (legal, professional, conduct, best practice, tort).
3. Reinforce school bus driver accountability,.

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The School Bus Collision Investigation Newsletter

Volume 1, Issue 11

School Bus Student Pedestrian Collision Investigation

Fundamental differences must be recognized by the School Bus Collision Investigation Team (SBCIT) regarding school buses and pedestrian collision investigations. Those differences include determining:

1. Did the pedestrian collide with another vehicle at an authorized bus stop location?
2. Did the pedestrian collide with a school bus as the collision event?
3. Did the school bus collide with one or more pedestrian(s) at the authorized bus stop location?
4. Was the pedestrian a student passenger who was assigned to the school bus in this collision event?
5. Was the pedestrian another person who was not a school bus passenger?
6. Where was the exact location and direction of the pedestrian when struck by the school bus?
7. Where was the exact location and direction of the pedestrian when struck by the other vehicle in relation to the school bus position?
8. What was the pedestrian body position when struck by the school bus?
9. What type of school bus was involved in this collision event?
10. What part of the school bus was involved in the first harmful event (FHE) of the pedestrian?
11. What was the height of the school bus front bumper and how would the bumper area impact the pedestrian's body height?

The SBCIT must describe the actual pedestrian movements and actions or behavior without inferring specific pedestrian decision errors which were not observable or could not be reasonably inferred.

Pedestrians Colliding with School Buses. The SBCIT must consider all types of pedestrian collision events including those directly caused by the pedestrian as the object colliding with the school bus. Traffic regulations and court decisions generally favor the pedestrian even though that pedestrian is the striking vehicle or object against a school bus. Pedestrians on skateboards, sleds, toboggans, skis, skates, rollerblades and other similar equipment may not be able to effectively control their encroachment into the school bus lane of traffic. Pedestrians may act impulsively and run out into traffic ahead of or to the side of a school bus. Pedestrians have been known to attempt a bumper ride on their skateboards or rollerblades and collide with the bus when it stops.

Pedestrian Safety While in Residential Crosswalks.

1. Did the school bus collide with one or more pedestrian(s) while they were in residential crosswalks?
2. If there was no known in advance threat to pedestrian safety in the residential crosswalk when a school bus collision event occurred then the SBCIT should reconsider all bus stop danger factors.
3. SBCIT will determine the number and type of school bus stop arm violations at this location.
4. SBCIT will determine what, if any, countermeasures can be assured to prevent any future student pedestrian collision with the school bus.
5. The SBCIT will determine if the other vehicle from the opposing lane did not stop for a pedestrian in the residential crosswalk.
6. Did the school bus driver fail to check the front of the bus and struck a pedestrian with the front bumper before that pedestrian could clear the bus and continue on across the street?
7. Did the school bus driver not check the rear or side view mirrors to see a pedestrian running for the bus when the bus hit the pedestrian?
8. Was the school bus turning left in a left turn lane hit a pedestrian in the residential crosswalk when the walk sign was green?
9. Was the school bus turning right in a right turn lane hit a pedestrian in the residential crosswalk when the walk sign was green?
1. What bus stop locations should be moved to avoid left or right turn student pedestrian collisions?

Student Pedestrian Decision Errors or Faulty Assumptions Made That Led to a Collision with the School Bus.

1. Was there any identifiable and validated pedestrian decision error that was made that caused this school bus vs. pedestrian collision event?
2. Did the student pedestrian assume that the school bus would stop and yield right-of-way?
3. Did the student pedestrian assume that the school bus driver (SBD) was aware of his or her presence beside the roadway and was intending to enter that roadway?
4. Did the student pedestrian assume that the SBD was aware of his or her already having entered into the roadway?

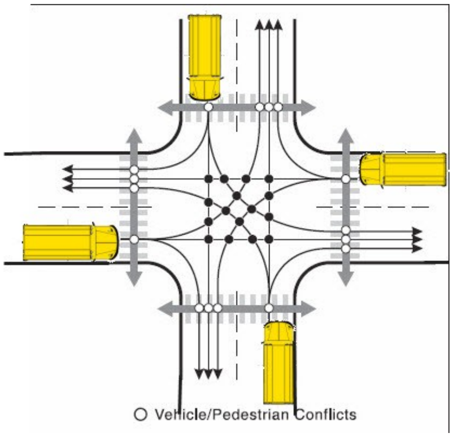
SCHOOL BUS ACCIDENT RECONSTRUCTION, LLC

The School Bus Collision Investigation Newsletter

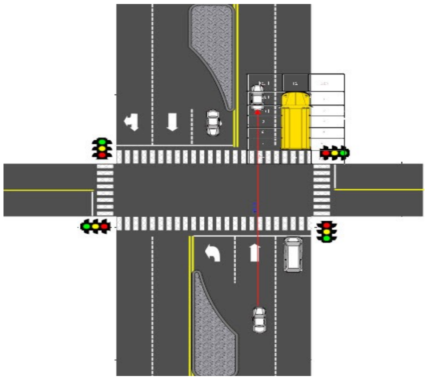
Volume 1, Issue 12

SBCIT Hazardous Bus Stop Countermeasure Investigation

This newsletter will discuss the various types of school bus stops and the nineteen (19) ways other motorists, as stop arm violators, can and do endanger, injure or fatally injure student pedestrians who receive school bus service. The stop arm violation scenarios are all indicated as authorized school bus nearside bus stop locations. See the diagram below for four possible nearside bus locations at an intersection.

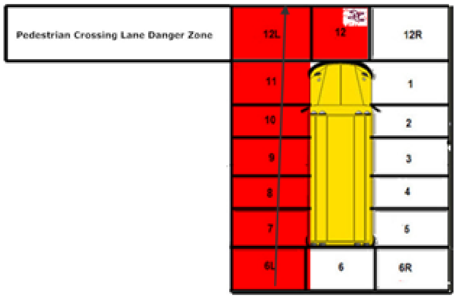


Note in the diagram above there are multiple crosswalk student pedestrian collision events (white dots) as well as multiple intersection student pedestrian collision events.



Next is an diagram of an authorized far side bus stop location (Column left below.) This diagram illustrates one of four possible locations for a farside bus stop all of which share the same limitations and pedestrian risk factors. The SBCIT should place themselves in the school bus driver's seat for each of the scenarios described below and determine for themselves what their field of view, student pedestrian sightlines and other factors would be at a nearside bus stop compared to a farside bus stop. Each nearside bus stop location diagram can be used as a midblock bus stop location but with different driver field of view and student pedestrian sightlines. The midblock bus stop is a simpler set of student pedestrian risks or driver monitoring challenges. Midblock bus stops are more complex when four lanes (two in each direction) are involved and at the same time there are students who cross the roadway midblock under the "protection" of the school bus flashing overhead red lights and the stop arm deployed.

A clockwise danger zone and roadway crossing zone designation was used that is unique to the school bus stop with which the SBCIT must be thoroughly familiar. In review, note that the right bus front panel is marked as 1, the school bus service door is marked 2 and downward through 3 to 6R (Six Right Zone). Directly behind the school bus is zone 6. The left rear corner of the bus on the driver side is 6L. Zones 7 through 12L (Twelve Left) indicate the center lane risk danger zone areas. 12 is the most dangerous area for student pedestrians where more fatalities occur than any other danger zone position. The "Pedestrian Crossing Lane Danger Zone" is not numbered. This area represents the approach or departure pathway of the student pedestrian to or from the school bus.



Scenario One Example: A motorist Stop arm violator (SAV) passes through stop arm signal from the rear to front on the left side of the school bus 6L to 12L while the student pedestrian (PED) whose identification number is (PEDID) is in front of the bus (12) at the closest point of contact. Notation for this stop arm violation is:

PEDID: 6L to 12 L with PED @ 12, No collision event, Yes proximity Conflict.

SBCIT: Countermeasures available to be implemented if not verified as being done by the school bus driver in this investigation.